REMARKS

I. Status of the Claims

Applicant respectfully submits this Reply in response to the Office Action mailed on January 29, 2010 (the "Office Action"). By this Reply, Applicant has amended claims 1 and 14, and canceled claims 5 and 18, without prejudice or disclaimer. Accordingly, claims 1-4, 6-17, and 19-39 are now pending in this application, with claims 1 and 14 being independent. No new matter has been added via the claim amendments.

In the Office Action, claims 1-26, 35, and 39 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,556,708 to Hörl et al. ("Hörl") in view of U.S. Patent No. 5,037,656 to Pitt et al. ("Pitt"); claims 27-30, 32, and 36 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Hörl in view of Pitt and U.S. Patent No. 6,774,102 to Bell et al. ("Bell"); claim 31 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Hörl in view of Pitt, Bell, and U.S. Patent No. 4,668,399 to Duggins ("Duggins"); and claims 33, 34, 37, and 38 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Hörl in view of Pitt and U.S. Patent No. 4,618,533 to Steuck ("Steuck").

Applicant respectfully traverses the above rejections for at least the following reasons.

II. The Independent Claims

Amended independent claim 14 recites a method for producing a separation material. The method comprises, among other things, "providing a solid substrate selected from the group consisting of polyacrylates, polystyrene, polyethylene oxide,

cellulose, cellulose derivatives, polyethersulfone (PES), polypropylene (PP), polysulfone (PSU), polymethylmethacrylate (PMMA), polycarbonate (PC), polyacrylonitrile (PAN), polytetrafluorethylene (PTFE), cellulose acetate (CA), regenerated cellulose, and blends or copolymers of the foregoing, or blends or copolymers with hydrophilizing polymers, preferably with polyvinylpyrollidone (PVP) or polyethyleneoxide (PEO), the solid substrate having a substrate surface, wherein primary or secondary amines are coupled to the substrate surface." The method also includes "covalently coupling the primary or secondary amines with a thermally labile radical initiator in the presence of a water soluble carbodiimide," "contacting the substrate surface with a solution of polymerizable monomers," "wherein thermally initiated graft copolymerization of the monomers forms a structure of adjacent functional polymer chains on the substrate surface, and wherein the graft copolymerization is carried out in aqueous solution." Amended independent claim 1 recites a separating material formed by a process comprising the same steps as the method of claim 14.[1]

A. Hörl and Pitt fail to disclose or suggest "covalently coupling the primary or secondary amines with a thermally labile radical initiator in the presence of a water soluble carbodiimide," as recited in the independent claims.

In rejecting claims 1 and 14, the Examiner concedes that Hörl "does not disclose the use of a thermally labile radical initiator." Office Action at 4. The Examiner then relies on certain alleged teachings of Pitt to cure the aforementioned deficiency of Hörl.

[1] Applicant notes that claims 1 and 14 have been amended to include the recitations of previously presented dependent claims 5 and 18, respectively. Although previously presented dependent claims 5 and 18 were listed as rejected under Section 103 over Hörl in view of Pitt, the merits of these claims were not addressed in the body of the Office Action. See Office Action at 3-6. While Applicant submits that claims 1 and 14 are allowable for the reasons set forth below, Applicant requests that, if after reconsideration of this application, the Examiner asserts a new grounds of rejection based solely on the recitations of previously presented claims 5 and 18, that that rejection be made non-final.

See id. at 4-5. Even assuming the Examiner's characterizations are accurate, which Applicant does not concede, the combination of Hörl and Pitt fails to meet each and every element of independent claims 1 and 14. Pitt, like Hörl, does not disclose, teach, or otherwise suggest "covalently coupling the primary or secondary amines with a thermally labile radical initiator in the presence of a water soluble carbodiimide."

In contrast, Pitt merely discloses, for example, that

> [s]ubsequent to wetting [a] porous membrane, a reagent bath comprising [a] cell adhesion and growth promoting composition, a free radical polymerizable monomer, a polymerization initiator and cross-linking agent in solvent comprising water or water and a water miscible, polar, organic solvent for these constituents is contacted with the porous membrane under conditions to effect free radical polymerization of the monomer and coating on the porous membrane with a cross-linked polymer.

Pitt at 3:58-67. There is no teaching or suggestion, however, that either of the reagent bath and the solvent of Pitt includes "a water soluble carbodiimide."

B. The Hörl process is not suitable for copolymerization of monomers on a substrate surface having primary or secondary amines, as recited in the independent claims.

Hörl discloses "a method for grafting unsaturated monomers to nitrogen-containing polymers in an aqueous solution." Hörl at Abstract. However, and as discussed in the enclosed Declaration Under 37 C.F.R. § 1.132 ("the Declaration"), the Hörl method is not adequate for "copolymerization of [] monomers . . . on a substrate surface," the substrate surface being coupled with primary or secondary amines, as recited in amended independent claims 1 and 14. The Declaration explains the details and outcomes of various "tests [performed] to determine if the process suggested by Hörl et al. (US 5,556,708) for grafting monomers to a polymer exhibiting a primary amino group is a possible way to couple monomers to amino functional groups on a

polymer in the absence or presence of any organic solvent." Declaration at 2. Generally, the tests included grafting a resin exhibiting primary amino groups (Toyopearl EP70 R 501 GC resin) with common monomers disclosed in Hörl and the instant application (DMAPMA and DMPA, respectively). See id. at 2-4. Separate resins were grafted with one of the common monomers via the method taught in Hörl and the method taught in the instant application, either in a solvent having an organic solvent (e.g., carbon tetrachloride, as disclosed in Hörl) or absent an organic solvent. See id. Each grafted resin then was tested for its respective protein binding capacity (e.g., by determining the adsorption capacity of BSA for each grafted resin). See id. at 4. The protein binding capacity of each grafted resin correlates to the coupling efficiency of the chosen monomer to the grafted resin. See id.

As evidenced in Table I of the Declaration, the change in protein binding capacity (the "BSA Adsorption" column), and thus the monomer coupling efficiency, of the grafted resins produced via the Hörl method (rows 1, 2, 7, and 8) compared to that of an untreated or non-grafted control resin (row 9) is not significant and therefore unsuitable for grafting monomers according to Applicant's claimed method. See id. at 5. Such a minor difference between binding capacities is further elucidated by the significantly greater degree in binding capacity evidenced by the resins grafted via Applicant's claimed method (rows 3, 5, and 6). See id. Accordingly, it can be concluded that monomers were not effectively coupled to resins exhibiting amino functional groups via the Hörl method. Therefore, the Hörl method is not suitable for grafting monomers to a primary, and consequently also to secondary, amino groups for obtaining a separation material. See id. at 6.

C. Hörl and Pitt do not disclose or suggest providing a solid substrate selected from the group consisting of the materials recited in claims 1 and 14.

Neither Hörl nor Pitt discloses, teaches, or otherwise suggests "providing a solid substrate selected from the group consisting of polyacrylates, polystyrene, polyethylene oxide, cellulose, cellulose derivatives, polyethersulfone (PES), polypropylene (PP), polysulfone (PSU), polymethylmethacrylate (PMMA), polycarbonate (PC), polyacrylonitrile (PAN), polytetrafluorethylene (PTFE), cellulose acetate (CA), regenerated cellulose, and blends or copolymers of the foregoing, or blends or copolymers with hydrophilizing polymers, preferably with polyvinylpyrollidone (PVP) or polyethyleneoxide (PEO), the solid substrate having a substrate surface, wherein primary or secondary amines are coupled to the substrate surface," as recited in amended independent claims 1 and 14.

Furthermore, and contrary to the Examiner's assertions, the separating material recited in amended independent claim 1 is not an unpatentable product-by-process. As discussed above, Hörl and Pitt at least fail to disclose or suggest a solid substrate selected from the group consisting of the above materials. Accordingly, but without necessarily acquiescing to the Examiner's characterizations of claim 1, Applicant submits that the separating material "product" of amended independent claim 1 is patentable over Hörl and Pitt for at least this reason.

D. Bell, Duggins, and Steuck do not cure the deficiencies of Hörl and Pitt.

The Examiner relies on alleged teachings of Bell, Duggins, and Steuck, which Hörl and Pitt fail to disclose or suggest. See Office Action at 6-9. Even assuming the

Examiner's characterizations are accurate, which Applicant does not concede, Bell, Duggins, and Steuck do not remedy the aforementioned shortcomings of Hörl and Pitt.

Accordingly, for at least the reasons discussed above, independent claims 1 and 14 patentably distinguish over Hörl, Pitt, Bell, Duggins, and Steuck, each alone or in any combination.

III. The Dependent Claims

Each of claims 2-4, 6-13, 15-17, and 19-39 depends from either amended independent claim 1 or 14 and is patentable for at least the reasons discussed above with respect to amended independent claim 1 or 14. In addition, the dependent claims recite unique combinations that are neither taught nor suggested by the cited references, and therefore, also are separately patentable based on these recitations.

IV. Conclusion

In view of the foregoing amendment and remarks, Applicant respectfully requests reconsideration and reexamination of the application, and the timely allowance of the pending claims.

The Office Action contains characterizations of the claims and the related art, with which Applicant does not necessarily agree. Unless expressly noted otherwise, Applicant declines to subscribe to any statement or characterization in the Office Action.

In discussing the specification, claims, and/or drawings, it is to be understood that Applicant is in no way intending to limit the scope of the claims to an exemplary embodiment described in the specification or abstract and/or shown in the drawings.

Rather, Applicant is entitled to have the claims interpreted broadly to the maximum extent permitted by statute, regulation, and applicable case law.

Please grant any extensions of time required to enter this Amendment and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: */Aaron L. Parker/*
Aaron L. Parker
Reg. No. 50,785
(202) 408-4000